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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 151

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8 July 1982

WORLDWIDE REPORT
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EDITORIAL SAYS U.S., USSR HAVE FAR TO GO TO NUCLEAR PACT

Melbourne THE AGE in English 11 May 82 p 13

[Text]

IT might be reasonable to assume in these days of international economic gloom that the Governments of both superpowers face irresistible pressures to reduce military spending. Pressures indeed exist, but there is very little evidence to suggest that either Washington or Moscow finds them irresistible. President Reagan and President Brezhnev, it is true, are given to offering nuclear arms reductions, which appear to be heart-warmingly magnanimous until examination reveals that they are nothing of the kind, or cannot possibly be acceptable to the other side, or both. The nuclear propaganda war conducted at the highest level and with the maximum of publicity should not be confused with what is really happening behind closed doors in Geneva.

Mr Reagan's statement at the weekend, for example, tends to obscure the Administration's belief that the West is at a serious nuclear disadvantage, which is a myth, and that the time for serious negotiation with the Russians is when the United States has built up a lead. Some in the Administration go farther by pointing to the severe strains in the Soviet economy and suggesting that Moscow must be close to the point where it simply cannot continue to compete militarily. The United States, they say, should therefore speed the decline by withholding Western loans, technology and food. This double-edged strategy could make some sort of sense, particularly at a time when the Kremlin itself is warning Soviet consumers that current industrial growth may be the slowest since World War II and that agriculture is in its usual mess. Even if the Russians will not agree to the kind of arms control measures acceptable to Washington, the thinking runs, there is still no cause for regret: Soviet efforts to match a surge in American military spending will multiply Moscow's economic plight and weaken it anyway.

But all of this accepts, of course, that the United States can afford to pursue these expensive tactics in an open political society now deeply concerned with its own economic distress and aware of defence spending's contribution to deficits, tight money and industrial bottlenecks. What it does not fully recognise either is that Soviet citizens, hardly accustomed to overt questioning of the Kremlin's ways, are abundantly familiar with economic parlousness. In the Western interpretation of the term, there is no such thing in the Soviet Union as economic crisis; there are merely degrees of chronic shortage for everything save the military budget.

Mr Brezhnev has always given his generals what they have requested, even when it has meant denial, mediocrity, stagnation and despair in the civilian sector. The ruling gerontocracy might have lost all justification for its existence. Its ideology might be in tatters. It might have to scratch for money by dumping gold and oil on international markets, and for food by becoming the world's biggest importer of grain. But it would be naive and dangerous to believe that the Soviet Union is approaching the stage where butter must take precedence over guns.

Such a day might come, but not yet. There is no evidence that the United States can alter the Soviet Union's strategic aims by throwing dollars at them. As observed by Dr Harold Brown, President Carter's Defence Secretary, when the United States builds up its military forces, the Russians build up theirs; when the United States does not build up its army, the Russians build up theirs anyway.

On Sunday, the Soviet Defence Minister, Marshal Ustinov, reaffirmed that Moscow would counter Mr Reagan's build up with one of its own, a warning that can be taken seriously. This preoccupation with numbers evades the fact that both superpowers already have enough weapons to ensure mutual destruction, a theme apparently in Mr Reagan's mind during his speech on Sunday proposing a one-third cut in long-range nuclear weapons. The proposals are admirable. The rhetoric is flawless. Mr Reagan has come a long way from the speeches of his campaign. But there is still a long way to go before Moscow and Washington emerge from the mists of political theatre and produce the sort of agreements that humanitarian and economic pressures demand.

RAIL WORKERS BALK AT HANDLING UNIDENTIFIED RADIOACTIVE CARGO

Perth THE WEST AUSTRALIAN in English 14 May 82 p 8

[Text]

MELBOURNE: Rail workers have black banned a rail wagon carrying an unidentified radioactive container destined for WA. They say the ban will stay till they are told what is in the container and what it will be used for.

The acting Victorian president of the Australian Railways Union, Mr Frank Lacey, said yesterday that the union had been given three different stories on the contents of the container.

It had been told the container held measuring devices, then cobalt, then gauges.

According to the union, the container was taken off a ship from the United States last week. It came to the workers attention a few days ago when the distinctive triple triangle radiation warning sign was noticed.

The container's labels gave no indication of what was inside.

The container was destined for the Kewdale terminal in Perth.

Contents

Mr Lacey said the union's WA branch had also been unsuccessful in finding out about the contents.

The men have refused to go near the container which is in a terminal at

Appleton Dock, till they are satisfied that it is safe.

"If we can be given that assurance, the ban will be lifted immediately," Mr Lacey said.

"For example, if it's cobalt for medical purposes, that's fine. But if it's something that's eventually going to be used to mine or process uranium we won't handle it." "The main problem is that we've been given the runaround."

The Vicrail general manager, Mr Bob Gallacher, said last night that the union had misunderstood explanations of what the wagon contained.

Claiming

"They are claiming they were given three explanations, when in fact it was just one," he said.

"The device is a radiation-type measuring gauge. Its source of radiation is cobalt-60 with a very low activity."

He said that many of the devices were used in Australian industry.

The device measures liquid in sealed tanks. The radiation source is put on one side of the tank and a radiation receiver on the other side.

Inquiries

In PERTH, the secretary of the WA branch of the ARU, Mr Jim Hanley, said that he had made inquiries in Melbourne and was told the container held cobalt-60 and gauges.

However, he had not been told officially by Westrail what was in the container.

There was an understanding between the Australian railways and the union that workers and depots were to be notified of any radioactive materials carried by the railways.

"There have been three or four different stories about what's in the container and it is very unsatisfactory," Mr Hanley said. "If it gets through to WA and we receive no confirmation about it our workers won't touch it."

EXXON ACTION HITS FUTURE OF AUSTRALIAN URANIUM MINING

Melbourne THE AGE in English 14 May 82 pp 1, 3

[Article by Nigel Wilson]

[Text]

PERTH. — The future of Australia's uranium mining industry was put in further doubt yesterday by the decision of Esso to pull out of the \$350 million Yeelirrie project in Western Australia.

The future of the joint venture — regarded as the most sound of Australia's planned uranium schemes — is now in doubt.

It is believed that unless another foreign investor can be found the project will be scrapped by the remaining partners, Western Mining Corporation and the big German metal company Urangesellschaft.

Esso was to have provided 80 per cent of the money to start producing uranium yellowcake from the low-grade Yeelirrie deposits, 400 kilometres north of Kalgoorlie.

The Deputy Prime Minister, Mr Anthony, said yesterday the Federal Government was ready to consider new proposals for restructuring participation in the Yeelirrie project.

Mr Anthony said he was confident of the long-term market for Australian uranium and the continued development of the industry. He said this was because there was no alternative to continued recourse to nuclear power if the world's energy needs were to be adequately met.

The ALP spokesman on the environment, Mr West, said the decision was another blow to the viability of the industry. He said it was incredible that Mr Anthony was still insisting that the project should proceed and the full range of projected uranium mining development should also proceed.

The Federal Government was so encouraged by the Yeelirrie ventures that it altered its uranium policy specially to allow the ven-

ture to be established.

Esso has spent more than \$20 million as its share of the study which is scheduled to be completed in August.

In a statement yesterday the company said it had become apparent that Esso's continued involvement in the project was not economical under the terms of the Yeelirrie joint venture agreement.

At present prices Yeelirrie's reserves would be worth about \$2000 million, or less than half their worth five years ago.

The joint venture agreement backed by West Australian legislation provides that WMC would have 75 per cent of the equity in the scheme, ESSO 15 per cent and Urangesellschaft the remaining 10 per cent.

But Esso was to provide 80 per cent of capital cost and, as well as being responsible for selling its share of the production, would pay WMC an undisclosed fee for the right to sell a further 35 per cent of the output.

Esso officials said yesterday that when the agreement was signed in 1978 the company's assessments had been made on a uranium price of about \$40 a pound (454 grams). The price had

fallen to about \$20 which meant the company could not make money through its arrangement with WMC.

Esso had decided to pull out after its scheduled commitment to its first stage — the feasibility study — was completed in August.

The company also noted that different assessments of market conditions could be made. Its officials said the project could be commercial if all the partners were responsible for selling uranium production equal to their equity.

WMC's chairman, Sir Arvi Parbo, said last night he would have preferred Esso to remain in the Yeelirrie project.

But since the oil company had made its plans known to the other joint venturers, WMC had approached several overseas companies, all of which had expressed interest in the scheme. Detailed negotiations would begin in the next few weeks.

Sir Arvi noted, however, that unless a replacement for Esso

could be found by February next year plans to move to a mine and processing plant would be delayed.

The Yeelirrie deposit was announced in January 1972 after a spectacular geological sleuthing programme by WMC's exploration team.

By the time an agreement to develop the deposit was signed with the West Australian Government in 1978, WMC was reporting that the deposit was estimated to contain 46,000 tonnes of uranium oxide (U3O8 or yellowcake) at an average grade of 0.15 per cent.

Although the grade is low compared with other uranium deposits in Australia, metallurgical tests have shown that it is relatively easy to extract the uranium from the ore.

The project was originally scheduled to begin operating early this year with an annual output of 2500 short tons. The target production date up until yesterday had been mid-1985.

AUSTRALIA'S MAIN URANIUM PROJECTS

Project	Yearly output (tonnes a year)	Status
Operating:		
Mary Kathleen	850	Set to close this year.
Nabarlek	1500	Mining finished. Stocks to be sold by 1989.
Ranger	3000	Mining started last year. Contracts secured.
Approved:		
Yeelirrie	2500	Due to start in 1986 but future now uncertain.
Jabiluka	4500	Approval conditional on agreement with Northern Lands Council. Contracts being sought. Due to start 1986.
Lake Way	500	Partners, CSR and Vam have not yet decided to proceed. Due to start 1984.
Under negotiation:		
Koongarra	1000	Environmental impact statement lodged but no agreement on Australian equity or aboriginal assent.
Honeymoon	450	Pilot plant being built to test solution mining techniques.
Roxby Downs	—	Shaft sunk to test ore.

The link with Esso was designed to give the project access to the United States market.

Sir Arvi said it was not possible for WMC and Urangesellschaft to complete the project on their own. It was possible that several foreign partners would

have to be found to dispose of the 50 per cent of Yeelirrie production which Esso had planned to take.

But under Australia's uranium exploitation guidelines WMC cannot reduce Australian equity below 75 per cent.

The guidelines were adjusted by the Federal Government in 1978 to allow Esso to take a far greater percentage of the output than it would have been entitled to under the original rule.

The Esso decision is a blow to the WA Government, which in the past eight months has seen the delay of a big alumina project at Wagerup, the deferment by a year of the export stage of the huge North-West Shelf gas project and the closure of several gold mines.

CSO: 5100/7533

FRENCH EXPERT DESCRIBES URANIUM ENRICHMENT NEEDS

Canberra THE AUSTRALIAN in English 13 May 82 p 14

[Article by Nicholas Rothwell]

[Text] AUSTRALIA would only be able to develop its proposed multi-billion dollar uranium enrichment industry if corporate planners chose the right technology and the global demand for uranium remained stable, a top French nuclear industry executive told the ANZAAS congress yesterday.

Mr Michel Mezin of the Commissariat a l'Energie Atomique, France's atomic energy agency, told the meeting uranium enrichment could be handled by industrial companies and be carried out "in a multi-national frame" with the participation of many companies.

France maintains a permanent office in Australia headed by Mr Mezin, and is one of the main technology competitors in the battle to win the contract for Australia's first enrichment plant.

COMPETITION

A consortium of four leading Australian companies — CSR, WMC, BHP and Peko-Walls-

end — has formed a government-approved uranium enrichment group to build the pioneering local facility.

Mr Mezin said that despite variations in the amount of power needed to enrich uranium, the energy expended remained small by comparison with that produced.

France is in direct competition with Japanese and American firms and with the European URENCO consortium.

French officials are known to regard with some concern the close cultural links between Australia and other English-speaking nations which they feel may lead local planners to make their decision influenced by factors beyond purely market considerations.

Mr Mezin gave details of the ambitious plan formed by American and Japanese enrichment firms but stressed that France was in a promising position because of its extensive commitment to a commercial nuclear power program and its highly trained corps of nuclear engineers.

He stressed that enrichment was a technology that should only be developed on economic grounds because of the exten-

sive cost of the plant required for the process.

"Australia has been keen in the past to sell its raw materials in the most elaborate form in order to increase its income and promote its industry.

"Uranium enrichment obviously falls into this category; provided that Australia can gain access to the manufacture of all of the components needed and is not obliged by the technology holder to import them," Mr Mezin said.

But the lack of any "significant" nuclear generation program in Australia meant that uranium enrichment would be an export-oriented activity for the foreseeable future, he said.

Mr Mezin said Australia would need a reliable market for its nuclear fuel exports "It would be an excellent asset if one country were to provide both enrichment technology and a uranium market", Mr Mezin said pointedly.

France has offered Australia a contra-deal in informal talks at the highest level, under which Australian uranium would be bought for use in French power stations if this country selected the French enrichment technique.

CSO: 5100/7533

GOVERNMENT STUDYING RADIATION EFFECTS ON A-TEST WORKERS

Brisbane THE COURIER-MAIL in English 10 May 82 p 3

[Text]

CANBERRA. — Thousands of Australians will be reminded soon of the potentially hazardous role they played in helping Britain to perfect her nuclear arsenal during the 1950s.

Their memories of long-forgotten places with such unlikely names as Emu Plains, Maralinga and the Monte Bello Islands will be triggered by an official letter from the Federal Government.

The letter will ask them to help in an investigation into the involvement of Australian servicemen and civilian workers in atomic tests.

The systematic search was ordered last June, following rising concern about deaths linked with atomic fall-out from 12 British nuclear tests on Australian soil between 1953 and 1957.

Reports from Adelaide in 1980 claimed there had been 52 deaths from cancer among the 2000 people who worked at the South Australian test sites, and that Aborigines in the area reported illness and deaths shortly after the atomic blasts.

Fears of dangerous side-effects from the blasts were fanned by scientific evidence in recent years, suggesting low levels of radiation are more dangerous than was thought at the time of the tests.

In those days, it was considered that once radiation fell below certain levels, fallout would not harm human beings.

British and Australian authorities used this evidence as the basis for their claims that there was no danger from fallout either to the test personnel or to local Aborigines.

Nuclear scientists who attended the tests still insist this is the case.

The Nuclear Veterans' Association main-

tains that people involved in the tests have since recorded a death rate four times the average for their age group.

Public debate over the potential dangers of atomic radiation is seen to be behind the government effort to trace about 13,500 people believed to have played a part in the test program, although only 2000 are seen as the "hard core" which actually was exposed to radiation.

The man heading the investigation, Mr Patrick Ryan, first assistant secretary with the National Development and Energy Department's uranium and general division, said last week the register of all Australians involved in nuclear tests was within weeks of completion.

The register will finish with about 16,500 names but, owing to some unavoidable duplication, the number of actual people involved in the test program will be closer to 13,500.

The register also includes about 500 test workers who have died, although this figure is expected to rise to 700 by the time the investigation ends.

Mr Ryan said there were difficulties in tracing the test veterans. "We were very surprised by the extent of detailed records available from the era. They were a great help," he said.

The register lists people with even a fairly remote connection with the tests, such as RAAF ground crews at Amberley Air Base in Queensland who worked on aircraft used to observe the blasts or in supply of the remote test sites in the north-western part of South Australia.

The department is also surprised by the relatively few people who have made legal claims for damages arising from their work at the test sites.

CSO: 5100/7533

AUSTRALIA

BRIEFS

ANTI-NUCLEAR SCIENTISTS--Report from Australian and New Zealand Association for the Advancement of Science [ANZAAS] Congress in Sydney--The formation of Australia's first association of scientists dedicated to the cause of nuclear disarmament was announced at the congress. The Association for Scientists Against Nuclear Arms will be devoted to the dismantling of nuclear weapons and other weapons of mass destruction. Its models will be similar groups of scientists in Britain and the United States. In a confidential document circulated at the congress, scientists were asked to join an organisation to lobby against the proliferation of nuclear weaponry. The document, which has been sent to researchers working in the physical, natural or social sciences, stresses the central role of the scientific community in creating the balance of nuclear terror. It says scientists realise the concept of limited nuclear war is completely untenable. [Canberra THE AUSTRALIAN in English 14 May 82 p 4]

UNION ANTI-URANIUM ACTION--BRISBANE--The ACTU will ask unions for money to support a publicity campaign and industrial action to fight the mining and export of uranium. The ACTU executive yesterday accepted a policy proposal to impose a levy to strengthen the opposition in principle which has been in ACTU policy for several years. The ACTU president, Mr Dolan, said: "It is a question of getting public support for the policy and trade union support for the policy." He said industrial action was unlikely to lessen, but support for unions taking action would depend on the response to the new proposal. [Melbourne THE AGE in English 14 May 82 p 4]

CSO: 5100/7534

ATOMIC ENERGY COMMISSION 20-YEAR PLAN REPORTED

Dacca HOLIDAY in English 23 May 82 p 8

[Text] A 5309 crore taka perspective plan to be implemented in 20 years has been chalked out by the Atomic Energy Commission while a number of ongoing projects earlier taken up by the commission has been gasping for breath due to acute paucity of funds.

The plan has recently been adopted by the commission in order to consolidate, strengthen and develop a local base of advanced science and technology to create an atmosphere for the transfer of technology and to achieve self-reliance in industrialization and national development.

The financial outlay for implementation of the first phase of the plan (1980-85) requires 606 crore taka including 706 crore taka for research and development and 500 crore taka for nuclear power.

It also provides 56.47 crore taka for the Savar atomic energy research establishment, 10 crore taka for beach sand commercial plant at Maheshkhali, and 500 crore taka for Rooppur power plant while the total number of projects in this phase stands at 18.

The second phase (1985-90) requires 1605 crore taka while a sum of 1530 crore taka is required only to develop the Rooppur power plant.

Two other instalments of 1668 crore taka and 1430 crore taka would be required to implement the third and fourth phases of the perspective plan.

On the other hand, a number of important projects earlier taken up by the commission to solve the existing power problems of both the eastern and western zones of the country has been lying unimplemented because the commission failed to generate the required funds.

The atomic energy research establishment at Savar where 3-mw research reactor has to be set up has so far spent 2312.85 lakh taka including a foreign exchange component of 1109.63 lakh taka.

The project requires more than 3121 lakh taka to complete the remaining portion of work while the 3-mw research reactor would cost at least five million US dollars.

It is learnt that due to inadequate allocation of funds 32 units of residential buildings for the project have remained incomplete while the development of infrastructural work was delayed by one year.

The commission took up another project, the beach sand commercial plant at Cox's Bazar for separation of zircon, rutiles, ilmenite and other minerals from the sea beach.

The pilot plant prepared a budget estimate of 303 93 lakh taka in foreign exchange. The project was envisaged on the basis of an Australian grant.

It is learnt that so far 247.31 lakh taka including 9.13 lakh taka in foreign currency have been spent on the project while deposits of 1,42,000 tons of zircon, 67,000 tons of rutile, 17,000 tons of monazite, 908,000 tons of ilmenite, 68,000 tons of leucoxene, 60,000 tons of kyanite and 360,000 tons of garnet with a total value reaching over 150 crore taka have been found.

Surprise

But surprisingly, the project could not get even a single customer for those items. A tender was invited by the project authorities last month for disposal of the items the last date of which was quoted as May 17. It is learnt that only two offers of tender document were sold but the parties did not return.

According to latest information the parties have asked for extension of the date of receiving tender offers and the date has accordingly been extended up to June 15.

The 1130 crore taka Rooppur power plant is yet to be completed. The project has remained incomplete for a long time. It is learnt that recently a fresh move has been taken to expedite its completion.

At present the Atomic Energy Commission consists of 27 chief scientific officers, 48 principal scientific officers, 58 senior scientific officers, 148 scientific officers and 398 technicians.

Concerned quarters pointed out that implementation of the perspective plan would require many more technically skilled hands while the country is severely lacking in skilled personnel in these fields.

Since independence more than 150 scientists and technicians from the commission have left the country for training or other reasons and many have not returned to the country.

CSO: 5100/7110

MARTIAL LAW OFFICIAL VISITS ATOMIC ENERGY COMMISSION

Dacca THE BANGLADESH OBSERVER in English 13 May 82 p 1

[Text] Air Vice Marshal Sultan Mahmud Deputy Chief Martial Law Administrator and Adviser for Energy and Mineral Resources on Wednesday stressed the importance of people-Oriented research by peaceful uses of atomic energy, reports BSS.

Addressing the scientists and officials of the Bangladesh Atomic Energy Commission, Dacca, the DCMLA called upon the scientists to innovate newer ways to utilise the nuclear power in the field of applied science for the benefit of the commonman.

Air Vice Marshal Sultan visited the Atomic Energy Commission compound and went round the different laboratories and other sections of the Commission. The Chairman of the Commission, Dr. Anwar Hossain and senior officials were present on the occasion.

Describing electricity as an essential pre-requisite for any industrial development the DCMLA said that the deficiency of power particularly in the Western Grid had put up enormous obstacles in agriculture, industry and other sectors. He said that the present government was undertaking various measures to enhance production of electricity. He also disclosed that a final decision would be taken soon in respect of the Rooppur Nuclear Power Project.

Air Vice Marshal Sultan expressed satisfaction at the progress of work on the three-MW research reactor at Savar near Dacca. He appreciated the achievements attained by the commission in the fields of food storage, medicine sterilisation disease detection training in advanced computer and establishment of an electronic institute in the country.

The DCMLA urged the scientists and researchers to concentrate more on application of science for the benefit of the commonman. He advised them to give priority on such research projects which would give immediate return and would benefit a large number of people.

The Adviser for energy said that the government was determined to remove the impediments on the way of adopting a proper administrative policy in respect of research work. He expressed his keen interest to exchange views on proper utilisation of science and technology for quick economic development of the country.

ATOMIC ENERGY DEPARTMENT RELEASES ANNUAL REPORT

Madras THE HINDU in English 28 May 82 p 16

[Text] BOMBAY, May 27. Preparations are in full swing for starting reprocessing of power reactor fuel at the Tarapur Atomic Power Station (TAPS).

A "few" spent fuel shipments have been made from the Rajasthan Atomic Power Station (RAPS) at Kota to be reprocessed at the TAPS, the Department of Atomic Energy says in its latest annual report.

It says fabrication, procurement and installation of all major equipment for the expansion of the plutonium plant at Trombay in South Bombay have been completed and installation process of pipelines is in progress.

A waste immobilisation project (WIP) is being set up near the plant and another WIP coming up at Tarapur for the conditioning of highly radioactive waste generated at the fuel reprocessing plant into inert and non-leachable solids.

Reprocessing at Kalpakkam: A project report for the Kalpakkam fuel reprocessing plant intended to reprocess spent fuel from Madras Atomic Power Project (MAPP) has been prepared and a detailed design work is on.

The report says good progress has been made on the setting up of a centralised waste management facility at Kalpakkam.

A Shillong report says:

AMD complex at Shillong: The Atomic Energy Commission Chairman, Dr. H. N. Sethna has called for a detailed survey of the north-east in the context of developing atomic mineral resources in the region.

Laying the foundation stone for a complex of laboratories and residential units of the Atomic Minerals Division (AMD) here yesterday, Dr. Sethna said "large tracts in the region, 'prima facie' seem to be promising for atomic minerals, particularly uranium".

CSO: 5100/7105

REPORT ON INDO-U.S. SCIENTIFIC MEETING AT BHABHA

Bombay THE TIMES OF INDIA in English 1 Jun 82 p 4

[Article by S. Kumar]

[Text]

BOMBAY, May 31.
DESPITE the stalemate over the supply of fuel for Tarapur by the United States, the Indo-US scientific co-operation appears to be still strong.

The Indo-U.S. symposium on nuclear physics which concluded here on Friday at the Bhabha Atomic Research Centre, the nerve centre of India's nuclear programmes, illustrates the existing ties between the two countries. The five-day symposium, jointly organised by the BARC and the National Science Foundation, U.S.A., was held in India after a lapse of five years. The significance of the conference can be understood from the fact that Dr. Raja Ramanna, director, BARC, though on leave, came down to BARC to inaugurate the symposium.

The symposium was kept a secret by the organisers and when contacted for details, the scientists from both the sides played down the affair as a routine gathering of academics. If at all any Indian scientist spoke, he preferred to remain anonymous. Obviously, the nuclear physicists from India and the U.S. did not want to enter into any controversy, particularly over the Tarapur agreement.

LECTURE CANCELLED

In a separate incident, an American delegate to the symposium, had to

cancel a public lecture, reportedly at the instance of the U.S. embassy officials in India. The Indian Association of College-Going Scientists, Bombay chapter, had arranged a slide-show, prepared by Dr. Michio Kaku, associate professor of nuclear physics at the City College of New York. Dr. Kaku makes devastating anti-nuclear statements and squarely blames the U.S. administration of being indifferent to nuclear safety.

The visiting scientist had, at first, agreed to contradict the seemingly exaggerated statements of Dr. Kaku. Later, the delegate refused to make any comment on the subject in India. He, however, agreed to furnish relevant material from the U.S.

A couple of months ago, another Indo-U.S. symposium on mass spectroscopy was held at the BARC, which was inaugurated by the then secretary to the department of science and technology, Prof. M. G. K. Menon. The symposium was poen to the press.

In the concluding session on Friday, in which all the BARC scientists were allowed to participate, representative speakers from the BARC and the NSF, reiterated the need for co-operation between the scientists of the two countries and held out the hope that the third symposium in the series would be held within two years.

RAPPORT ESTABLISHED

An important spin off from this gathering of scientists is the rapport

that has been established at a personal level which will continue irrespective of the political climate.

According to a participant in the symposium, the deliberations were "highly technical" as they pertained mostly to the theoretical aspects of studies in cyclotron and other accelerators, the most powerful tool for nuclear research.

In the opinion of a foreign delegate, Indian scientists' contribution at the symposium was of very high quality.

The valedictory address by Prof. Thomas A. Cahill, director of Crocker Nuclear Laboratory, University of California, Davis, served as popular lecture with fresh guidelines for the science policy makers. Speaking on the application of nuclear science in cyclotron and intermediate energy accelerators, he drove home the point that they were not merely basic research tools but had significant application in medicine, material damage studies and in the analysis of samples, including historical artifacts.

Particularly, the suggestion that accelerators can be used for conducting environmental tests at 10 to 20 times cheaper cost is worth considering by countries like India.

India has achieved a contemporary status in accelerator technology of the world with the variable energy cyclotron in Calcutta in operation. Plans are on the anvil for installing higher energy accelerators.

Incidentally, the VEC in Calcutta has been built with the U.S. aid.

CSO: 5100/7107

MORE DETAILS ON INDIAN NUCLEAR FREEZE SUGGESTION

Bombay THE TIMES OF INDIA in English 21 May 82 p 23

[Text] NEW DELHI, May 20 (UNI).

INDIA favours a "freeze on nuclear weapons" consisting of two inseparable elements— a complete cessation of the manufacture of nuclear weapons and a cut-off in the production of fissionable material for weapon purposes.

A note that India has submitted for the month-long special session of the United Nations general assembly devoted to disarmament, beginning from June 9, says that such a combined step would mean that all nuclear facilities everywhere in the world would become peaceful.

And in that event, the nuclear-weapon states would not have any reason, excuse or pretext for refusing to accept international safeguards on their own nuclear energy establishment, which they are asking non-nuclear-weapon states to accept on theirs, in the name of so called full-scope (or complete nuclear fuel cycle) safeguards, it adds.

Also, in that event, an effective and yet economical safeguards system could be devised on the basis of objective, scientific and non-discriminatory criteria, since it will be applicable to all states, it says.

In India's view, a freeze on nuclear weapons will greatly help in the prevention of nuclear war and will be an outstanding achievement of the special session.

It wants that the focus of the international community must remain on nuclear weapons. This basic

consideration has guided India's principal initiatives — in 1954, for the prohibition of all nuclear weapons tests; in 1964, for stoppage of all proliferation of nuclear weapons— be it horizontal or vertical, and in 1978, for the prohibition of any use of nuclear weapons, pending nuclear disarmament.

In India's view, the second special session of the general assembly will need to build on the final document of the first special session held in 1978. The adoption of the final document by consensus was a unique, significant and an unprecedented development, the note adds.

It says that the work of the forthcoming session will need to be organised as part of humanity's continuing quest for attaining the internationally agreed goal of general and complete disarmament under effective international control with the highest priority being accorded to the objectives of nuclear disarmament and elimination of all kinds of weapons of destruction.

Since the existence of nuclear weapons poses a grave threat to the very survival of mankind, the note says, world public opinion is increasingly veering to the view that the entire disarmament process leading to the cherished goal of general and complete disarmament would need to be completed within a fixed, short period that should be agreed to in advance.

INESCAPABLE FACTS

The Indian note lists the follow-

ing "basic and inescapable" facts about nuclear weapons:

1. The existing nuclear armouries already contain large megaton weapons, every one of which has a destructive power greater than that of all the conventional explosives that have ever been used in warfare since the day gunpowder was discovered.

2. The present arsenals of nuclear weapons (believed to number 50,000 or so) have an overkill capacity, that is of destroying all life on earth several times over.

3. A nuclear war is unthinkable, since the escalation would be immediate and the destruction would be catastrophic. There can be no winners in a nuclear war, since civilised life will cease to exist anywhere.

The note says that it is a matter of grave concern that systematic efforts are being made on the basis of erroneous thinking on disarmament in certain influential quarters to change the direction, shift the focus and distort the priorities from nuclear weapons to conventional weapons, from the global approach to regional approach, from measures of real disarmament and arms limitation to the so-called confidence-building measures and verification problems, from military alliances to non-aligned countries, and from the huge weapon stockpiles of the great powers to the legitimate means of defence of small countries.

The cause of real disarmament can never be served if such misguided efforts are permitted to be tolerated, it adds.

CSO: 5100/7106

REPORT ON INTERVIEW WITH AEC CHAIRMAN SETHNA

Calcutta THE STATESMAN in English 28 May 82 p 9

[Text]

"THERE is no indication of reduction of nuclear weapons by countries which possess them", Mr H. N. Sethna, chairman of the Atomic Energy Commission and Principal Secretary to the Government of India, said at Calcutta airport on Thursday. He was replying to reporters' questions on the possibility of reduction of nuclear weapons by the big Powers. "In fact, there is a move to have more efficient nuclear weapons which can cause more destruction and therefore, more deaths", he added.

Mr Sethna, who was on his way from Gauhati to Bombay, said that negotiations for the supply of enriched uranium for the Tarapur atomic energy plant by the USA were still continuing. "It will probably be discussed during Mrs Gandhi's coming visit to the USA" he said. Asked what would happen if the negotiations failed, Mr Sethna said that there were two alternatives for India. Either India would use the "mixed oxide" which was being produced at Tarapur or it might buy enriched uranium from France or

the USSR which supplied it on commercial basis. A decision on the matter would be taken after the Prime Minister's visit to the USA, he added.

Replying to another question on the use of nuclear weapons, Mr Sethna said that there was nothing like a limited nuclear war. If a nuclear war started, its effect would not be limited only within the countries involved in it. Such a war would mean the end of civilization, he said.

Explorations for uranium were being carried out in Madhya Pradesh, Himachal Pradesh, Bihar, Meghalaya and in parts of U.P., he said. Madhya Pradesh was the most promising among all these places. The Gomaghat-Shella region and the Washung valley in Meghalaya were also promising places for uranium, but the exploration work was difficult in this terrain because of lack of communication, he pointed out.

Asked whether India would produce nuclear bombs, Mr Sethna said that the country used atomic energy only for peaceful purposes.

CSO: 5100/7104

RELIGIOUS LEADERS NUCLEAR DISARMAMENT PROGRAM TOLD

Calcutta THE STATESMAN in English 27 May 82 p 11

[Text]

MAY 26.—While no tangible results were achieved, Archbishop Pangelio Fernandes of Delhi is "not dissatisfied" with his recent visit to Beijing as the leader of a delegation of the World Conference of Religion and Peace, which sought the assistance of China in the effort toward nuclear disarmament. Archbishop Fernandes is the president of the World Conference.

The 10-member delegation, which represented five religious faiths, had two meetings in the Great Hall of the People with Mr Kang Mao Zhao, currently China's Ambassador to the European Economic Community, who will lead his country's delegation to the forthcoming U.N. special session on disarmament. The delegation also met Mr Ji Pengli of the Council of State Affairs.

There were four points which the delegation stressed. The U.N. special session should set in motion the drafting of a convention marking the use, or threat of use, of nuclear weapons a crime against humanity. The special session should ask the USA and the Soviet Union to announce an immediate freeze of their nuclear arsenals as a first step towards nuclear disarmament, leading to deep cuts in the nuclear stockpile, and then general and complete disarmament. The freeze would include the signing of a treaty banning all tests of nuclear weapons.

The special session should also adopt a proposal for a U.N.-related world disarmament campaign to

spread universal education for disarmament. Signature campaigns, disarmament education in schools and colleges and campaigns in the media were necessary. U.N. backing was essential for such a campaign.

Finally, the delegation wanted the special session to demonstrate the link between disarmament and full human development. "We ask the special session to urge all States to transfer immediately a portion of their budgets allocated armaments to development projects, especially in developing countries. Today, nations spend \$600 billion on armaments. What a difference it would make if even a part of this amount was shared for the development of people. That is a better alternative, a safer and safer form of security".

Mr Kang Mao Zhao's response was: "I feel excited to find such common language with non-Government organizations and religionists in recognizing the serious nature of nuclear war and the nuclear threat". He reiterated China's stand that it would never strike first with nuclear weapons.

Archbishop Fernandes said his delegation had met the national religious leadership of the Buddhists, Muslims, Catholics, Protestants and Taoists. It had visited temples, churches and mosques.

The World Conference on Religion and Peace aims at sending delegations to all "nuclear capitals". Beijing was the first to receive such a delegation.

CSO: 5100/7103

NO EARLY END SEEN TO NUCLEAR POWER PROBLEMS

Calcutta THE STATESMAN in English 28 May 82 p 9

[Text]

NEW DELHI, May 27.—An early solution does not seem to be in sight for the problems which have plagued indigenous heavy water production and have seriously upset the nuclear power generation programme.

The Madras atomic power project, whose first unit has been ready for over two years and whose second unit is nearing completion, requires, for instance, an initial supply of 240 tons of heavy water to get started. There is no knowing when precisely that quantity will be made available to it. The total annual production of the three existing plants is less than half that quantity.

Parliament was told last month that the heavy water plants at Talcher and Kota would be commissioned during the current year. Both plants involved new technologies. The one at Talcher is attached to a coal-based fertilizer plant, and the one at Kota uses the new hydrogen sulphide-water exchange process. There is no indication yet as to when the problems posed by those new processes would be solved and the plants commissioned.

Both plants were originally scheduled to be ready well before the end of last year. Subsequently, it was stated that they should be on stream by June this year. Inquiries here suggest that no clear date can be given as yet for their commissioning.

Parliament was also told the action had been initiated for setting up two more plants and with effec-

tive capacity of 295 tons a year. Apparently only preparatory work has been initiated.

Even in respect of the plants proposed at Thal, Vaishet and Hazira, to be attached to the upcoming fertilizer plants there, little more than a firm decision on their setting up has been done. When these proposed new plants will come up is anybody's guess.

Meanwhile, the Baroda plant, with a modest capacity of 67 tons, has been closed down for over a week because of labour trouble. Only two plants are currently in operation: the Nangal plant (with a capacity of 14 tons) and the Tuticorin plant (67 tons). The performance of the second plant is, however, far from satisfactory, because of unstable power supply as well as other problems associated with the fertilizer plants.

Experts at the Department of Atomic Energy were not long ago planning to break with the present dependence on fertilizer plants for heavy water production and were working on various alternatives towards that end. No information is available here about the progress made by their experiments.

CSO: 5100/7104

BARODA HEAVY WATER PLANT SHUT DOWN FOR 'SAFETY'

Bombay THE TIMES OF INDIA in English 25 May 82 p 7

[Text]

BOMBAY, May 24.

PRODUCTION of heavy water, the most precious commodity needed for India's nuclear power programme, bedevilled by machine-made problems, has now been hit by a man-made problem, namely the strike by about 400 workers of the Baroda heavy water plant and its subsequent shut-down.

The strike by the workers and the closure are only the two extreme possible steps because the plant will pose a danger to the whole city of Baroda if run without adequate staff, thanks to its high pressure ammonia and hydrogen gases.

Dr. N. Srinivasan, director of the heavy water projects of the department of atomic energy, today told "The Times of India" that the safety of the plant, personnel and the whole area was paramount in his mind while ordering the closure. "The management has been anxious to redress the genuine grievances of the employees, if any, and the principal secretary, Dr. H. N. Sethna, will meet the workers as requested by them, if they call off their agitation and restore normalcy," he said.

The genesis of the labour dispute in the Baroda plant can be traced to the workers' demand for a bonus of 8.33 per cent under the Bonus Act as applicable to private and public sector undertakings. The heavy water plant, like the railways and postal departments, is a part of a government department and bonus cannot be paid to the workers according to the law.

However, the department had offered to pay a productivity-linked incen-

tive and accordingly six per cent of the annual wages was paid as incentive for eight tonnes of heavy water produced per quarter during 1980-81. The incentive was not given for 1981-82 as the production target of 30 tonnes per annum was not reached. This 30 tonnes per annum forms barely 40 per cent of the rated capacity of the plant and last year, the plant did not produce even such a meagre amount owing to many problems.

The workers contend that the low production was not due to their inefficiency but due to the deficiency of the plant and machinery and the inputs themselves.

The latest trouble arose when the management began the recovery of a festival advance of Rs. 400 paid in 1980. The workers started their agitation through gate meetings in March this year. They had submitted a charter of demands on December 16, 1981, which included the writing off of the festival advance. The workers' demands failed during the reconciliation proceedings before the assistant labour commissioner, Ahmedabad, on May 14. From May 17, the workers intensified their agitation and prevented the relief staff on shift duty from taking over the duties. The staff reported for duty about 90 minutes late. The workers' union, supported by the INTUC, also dissuaded the staff from doing overtime.

The workers resorted to a relay hunger strike and gheraoed the manager on Saturday when the police intervened. The plant was progressively shut down from May 19.

The director, Dr. Srinivasan, sent an appeal to the union on May 17 to give up its agitational measures but in vain.

'RESPONSIBLE SOURCES' COMMENT ON TARAPUR ISSUE

Calcutta THE STATESMAN in English 1 Jun 82 p 1

[Text]

NEW DELHI, May 31.—The Tarapur fuel issue, which has been hanging fire for almost two years and which is certain to be discussed by Mrs Gandhi with President Reagan during her visit to Washington in late July, has become even more intractable than before, responsible sources here say.

There seems, according to these, not the slightest hope that the U.S. Congress will agree to any request by the Reagan Administration for resumption of shipments of enriched uranium for the Tarapur atomic power station—which is located on the Arabian Sea, about 100 km north of Bombay, and was commissioned in April 1969.

It seems also extremely doubtful whether the Reagan Administration is at all keen on making such a request notwithstanding Mr Reagan's emphasis, about a year ago, on the need to re-establish the USA as a predictable and reliable partner for peaceful nuclear cooperation.

The only alternative is termination of the 1963 Indo-U.S. nuclear cooperation agreement, which placed on the USA the sole responsibility for supply of fuel for the

plant and which was to have lasted 30 years.

But such termination, these sources say, bristles with difficulties. For this question cannot be isolated from broader Indo-U.S. relations. Termination of the 1963 agreement is bound to affect those relations and might leave behind fresh problems.

The sources add that despite the reported consideration of the modalities of termination of the agreement in last year's Indo-U.S. talks, it is not as if a decision, firm or tentative, has been taken by either country regarding such termination.

Meanwhile, the dragging on of the discussions has affected the working of the Tarapur station, reducing its generation level to about half the installed capacity.

What is more disturbing is that it has created an anomalous situation and seriously inhibited this country's search for viable alternatives.

As long as the agreement remains in force, in howsoever unsatisfactory a fashion, India cannot obtain enriched uranium for the plant from any other source.

There have been "stray feelers", according to what Mrs Gandhi told Parliament during the Budget

session, regarding the possibility of supply of such enriched uranium for the plant "from sources other than the USA and including some private parties". The matter, however, had not pursued further because of the stipulation in the agreement against procurement of fuel from non-U.S. sources.

Also, it looks as if the agreement, which was implemented fairly satisfactorily till 1975, lulled this country into a complacency where no effort at all was made for indigenous enrichment of uranium (although it is quite possible that the prohibitive cost of enrichment was also a factor). It is only lately that preliminary studies have been undertaken on the various processes for uranium enrichment.

Development work on the production of a mixed fuel, or Mox, which is said to be an acceptable alternative, has reportedly been carried out. But a decision on its production, Parliament was told, would "at the appropriate time"—apparently when termination of the 1963 agreement becomes a certainty.

"We do want to end the present anomalous situation", says one official. But how? Few here have an answer.

CSO: 5100/7108

SECOND URANIUM ENRICHMENT PLANT PLANNED

OW110753 Tokyo KYODO in English 0712 GMT 11 Jun 82

[Text] Tokyo, June 11, KYODO -- Japan's second uranium enrichment plant will also be built in Okayama Prefecture, western Japan, to raise the country's uranium enrichment capacity more than four times than at present, paving the way for eventual self-supply of nuclear fuel, it was disclosed Friday. Japan's present annual uranium enrichment capacity is only 50 ton separative work units (SWU).

The second plant, a demonstration facility, will be built from fiscal 1983 at yen 70 billion (dollar 280 million). Using the centrifugal separation process, its annual production capacity will be 200 ton SWU.

The Science and Technology Agency has told the Okayama Prefectural Government that it would start geographical survey in three candidate sites in the prefecture -- Kamisai, Katsukita and Kume. The governmental Power Reactor and Nuclear Fuel Development Corp. (PNC), the main promoter of the project will ask the prefectural government for assistance early next week.

The demonstration plant is ultimately aimed at reducing the cost of enriched uranium to around twice the international level from three to four times as at present as the existing pilot plant using the same process.

CSO: 5100/2192

WRITER MAINTAINS PAKISTAN UNABLE TO PRODUCE BOMB

Bombay THE TIMES OF INDIA in English 22 May 82 p 8

[Article by Ravi Rikhye]

[Text]

THIS paper has seen the need for a debate on Pakistan's effort to develop the nuclear bomb. Dr. Sheel Kant Sharma, a physicist by training and a diplomat by profession, at present on study leave with the Institute of Defence Studies and Analyses, New Delhi, has taken issue with my earlier article in which I had argued that while Pakistan's efforts to make a bomb are not in doubt, it lacks the fissile material to succeed.

Can a bomb be made from reactor-grade plutonium, as Dr. Sharma holds? Ideally, the weapons-grade plutonium should contain no more than four per cent Pu-240/Pu-242 which absorbs neutrons instead of replicating them, thus dampening an explosion instead of aiding it, but a ten per cent contamination is acceptable. A reactor like Pakistan's KANUPP commonly gives plutonium with 30 per cent Pu-240/Pu-242.

It is wrong for me to state, without qualification, that bombs cannot be made from reactor-grade plutonium. Some respected scientists see no reason why even 50 per cent contamination cannot be accepted.

But while it is theoretically possible to accept a high degree of contamination, in practice no one has yet succeeded in making a bomb out of plutonium which is more than 12 per cent contaminated. According to Dr. R. R. Subrahmaniam, the U.S. once managed such an explosion. Incidentally, the first American plutonium bomb was made from weapons-grade material produced in a special reactor at Hanford, Washington, contrary to Dr. Sharma's belief. Will Pakistan succeed where others have failed?

While a crude device could be useful for a terrorist group, for a country seeking a nuclear deterrent, such a device would be useless because it could deteriorate in storage. It could even explode on its own. Its radiation would be intense and highly poisonous, and its yield would be unpredictable, perhaps as low as 0.1-kiloton (equivalent to 100 tonnes of TNT). This would hardly deter India, leave alone the Soviets.

"Grey Market"

The next issue relates to Pakistan's ability to acquire plutonium or uranium from the black market. It is necessary to differentiate between "grey-market" deals like South Africa's acquisition of enriched uranium (also reactor-grade, incidentally) and true black market operations. In the case of Israel and South Africa, various governments have sought to supply fissile material by circumventing their own legal restrictions on such transactions, leading to a grey market. To date, however, there has never been an authenticated report of any country acquiring weapons-grade material through the black market. And surely no country producing such material can have any interest in supplying it to Pakistan. Both Israel and South Africa are threatened bastions of white European civilization which must be protected almost at any cost. Not so Pakistan.

Pakistan does have a plutonium stock from KANUPP and from its five-megawatt research reactor in Islamabad. But this plutonium is under IAEA safeguards and is not available for manufacturing bombs, aside from being largely unsuitable in the first place.

onium. Though a bomb can be made less than ten kg, the purity required is higher, and in any case for a first effort this would be a safe minimum.

The KANUPP core is serviced by two semi-automatic refuelling machines, one which loads from one side and the other which unloads from the opposite side. Each machine has a computer which keeps a record of refuelling, and there is at least one camera on each side. The failure of one camera (we don't know which one did fail) proves nothing for two reasons. One, the computer keeps a record of operations even if the camera is not working. Two, the second camera suffices to alert the IAEA of any unusual happening.

Tracking Rods

The IAEA keeps track of all fuel rods entering the reactor. Pakistan now produce its own rods (the quantity is unknown), but these have to be stamped with IAEA-approved unique numbers. After the rods are withdrawn, the high radioactivity requires immersion in a cooling pond for around 150 days. The IAEA also checks the rod numbers in the cooling pond. In the case of low-burn-up rods, the residual radioactivity is much higher, which would imply an even longer time in the pond. Movement in and out of the pond is also monitored. Now, while it is possible to tamper with the numbers and to alter the computer record, each of these steps makes the possibility of successful covert diversion harder. Cumulatively, they may make covert diversion of more than small quantities impossible, especially with the IAEA being on the alert. These are only some of the safeguards that are employed. Others include a computer which continually monitors the state of the nuclear reaction in the core. Any addition or withdrawal of rods registers as a blip on this computer record. Shutting it off is a dead give-away of attempted diversion.

While KANUPP is being operat-

ed at low power, this is not the same thing as the low-burn-up of fuel elements. Canada is no longer supplying rods or heavy water to KANUPP, and Pakistan's own efforts in this direction are as yet insufficient to make up for the loss. This has affected the running of the reactor. Low-burn-up is immediately obvious to the IAEA inspector; he scans the fuel rod with a scintillation counter, which gives the exact burn-up.

Safeguards have to be subverted not just for a day but for 65 days to get sufficient plutonium for a bomb. KANUPP can be refuelled at an accelerated rate of 21 bundles a day, but again, that is a certain give-away.

The problems in making a bomb are difficult enough without the problem of covert fuel diversion. At best, Pakistan could divert a few grams of plutonium at a time, because complete security is impossible. But if it is diverting a few grams at a time, it will face immense difficulties in making a bomb. For example, if the techniques of microchemistry have to be applied to testing corrosion and the metal compatibility of plutonium, vital steps in making a bomb, this alone could set Pakistan back by five years.

Reports speak of Pakistan's continued efforts to obtain materials that could be used in a nuclear weapons programme. My information from highly-placed sources is that the uranium enrichment project is stalled and likely to remain so, both because of the embargo on supplies of nuclear materials to Pakistan and because of the inherent difficulties of building an enrichment centrifuge, especially for an under-developed nation.

There remains the problem of suspected diversion from KANUPP. The IAEA has already said that there is no evidence of diversion. Reports of diversion are based on two factors. First, since Pakistan has been making its own fuel rods since 1980, it could have interpolated these when a camera failed last year. Second, Pakistan has refused to permit the IAEA to take a more accurate count of the fuel rods in the reactor at low power and thus

reduce the percentage of Pu-240 and Pu-242 in the plutonium obtained as a byproduct when uranium is burned to produce power. Pakistan has been running KANUPP at less-than-rated output, reinforcing Indian suspicions that diversion of plutonium is taking place.

Actual Inspection

Before analysing the matter, a caveat needs to be entered. The IAEA does not publicise its actual inspection procedure. My research indicates that there are individual procedures for individual reactors and that since the Indian test of 1974, and even more so after Pakistan's bomb programme became known in 1978, the IAEA has been keeping a very close watch on KANUPP. It now wants even tighter controls, which are under negotiation with Pakistan. While some issues have been resolved, others have not. The IAEA procedure, however, clearly puts the burden of proof on the reactor operator. The IAEA does not have to prove diversion: the reactor operator has to prove to the IAEA on demand that no diversion has taken place. If at any time the IAEA is not satisfied, it sounds the alarm. This makes covert diversion of fissile material very much harder than might be assumed just from discussing the safeguard procedure, much of which in any case remains shrouded in secrecy.

Pakistan is being asked to accept safeguards which are much more stringent than are normally applied. It is naturally upset because it is being singled out.

KANUPP is a reactor of CANDU type, in which refuelling is done in continuous increments, eliminating reactor shut-down for refuelling, as happens in the American-origin light water reactor. KANUPP's normal fuel loading is four bundles of rods a day. For plutonium with a Pu-240/Pu-242 content of a little more than 12 per cent (the present-day maximum acceptable for an explosion as shown by the single U.S. test), Pakistan must divert 260 bundles of rods for ten kilograms of plu-

TAIWAN

BRIEFS

NO NUCLEAR WEAPONS PLANNED--The Executive Yuan declared that although the Republic of China is capable of developing nuclear weapons, it will not produce such weapons. Following repeated statements from President Chiang Ching-kuo to this effect, it said: Our future policy of nuclear research and study will be directed towards peaceful use of nuclear energy. In a written reply to a question by Legislator (Sun Yuan-shen), the Executive Yuan noted that although nuclear weaponry is a powerful deterrent force, what the country wants is to destroy the communist regime, not to build weapons that can be used against our brothers on the Chinese mainland. [Text] [OW160919 Taipei International Service in English 0100 GMT 15 Jun 82]

CSO: 5100/2192

SRV TO JOIN NUCLEAR NONPROLIFERATION TREATY

Note to Gromyko

OW161648 Hanoi VNA in English 1524 GMT 16 Jun 82

[Text] Hanoi, VNA, June 16 -- Foreign Minister Nguyen Co Thach has sent a note to his Soviet counterpart, A. Gromyko, informing him of Vietnam's decision to subscribe to treaty of nonproliferation of nuclear arms. The decision, the note says, stems from the S.R.V. Government's policy of protecting world peace and security from the danger of a nuclear war posed by imperialism and international reaction, and proceeds from the desire to use nuclear energy for peaceful purposes.

The note points out: "The Socialist Republic of Vietnam welcomes and highly values all effective international measures to gradually eliminate the danger of a nuclear war, including steps to protect nonnuclear countries from aggression with nuclear weapons and threat of such aggression. "The S.R.V. holds that in conformity of the objectives and principles propounded in the preamble of the treaty and the United Nations Charter, all nations are equals in the research on and the development and use of nuclear energy for peaceful purposes and in exercising their legitimate right to self-defence."

'NHAN DAN' on Treaty

OW170749 Hanoi VNA in English 0713 GMT 17 Jun 82

[Text] Hanoi, VNA, June 17 -- For the sake of peace and common security of nations, the Socialist Republic of Vietnam has joined the treaty of non-proliferation of nuclear weapons, NHAN DAN says in an article today.

The paper goes on: "This significant event has once more spoken out the consistent external policy of peace of the Vietnamese party and state. Prohibition against the proliferation of nuclear weapons is a question of great importance in reducing the danger of nuclear war, especially in the present situation when the United States is speeding up its arms race, seriously threatening peace and security of nations. The treaty of non-proliferation of nuclear weapons is a significant contribution to reducing the nuclear arms race, creating favourable conditions for nuclear disarmament and ensuring international peace and security. Therefore, it has received warm welcome and support from progressive public opinion throughout the world. The Soviet Union and other countries in the social unity have made important contributions to this treaty... Meanwhile, the United States, though a party to the treaty, has not implemented some of the most important clauses of the treaty. The Reagan administration is stepping up the nuclear arms race to an unprecedented level, intensively producing new types of nuclear weapons and deploying them on the territories of its allies."

The paper continues: "Proceeding from the external policy of peace of the communist party, Vietnam has adhered to the treaty of non-proliferation of nuclear weapons. This spells out our good will for peace, our strong support for and active contribution to the common struggle of nations to check the arms race, avert the danger of nuclear war, for peace, security and international cooperation, against the bellicose and aggressive policy of imperialism headed by the United States in collusion with international reactionaries. On joining this treaty, the Vietnamese Government laid stress on the need to ensure the security of the non-nuclear countries against aggression with nuclear weapons and against the threat of such aggression, and to ensure their legitimate right to self-defence.

"After adhering to this treaty, Vietnam, together with the Soviet Union and other countries in the socialist community and peace-loving forces in the world, will make active contributions to the common struggle to reduce international tension, and ultimately realize general disarmament. With regard to Vietnam in particular, this will open new prospects for further strengthening its cooperation with the Soviet Union and the other countries in the research on nuclear energy for peaceful purposes and for socialist construction," the paper notes.

CSO: 5100/2192

SRV JOINS NUCLEAR NONPROLIFERATION TREATY

LD171716 Moscow TASS in English 1648 GMT 17 Jun 82

[Text] Moscow June 17 TASS -- TASS news analyst Vasiliy Kharkov writes:

The Socialist Republic of Vietnam has joined the Treaty on the Non-Proliferation of Nuclear Weapons. A relevant document to this effect has been deposited with the Government of the USSR, which is the depositary of the treaty.

This is another manifestation of the peace [as received] foreign policy consistently pursued by Vietnam and the Vietnamese people's wholehearted allegiance to the cause of peace and social progress. Vietnam's decision helps to make the treaty, playing an important role in strengthening international security, more effective and comprehensive.

When the Non-Proliferation Treaty comes into force in the spring of 1970, Vietnam was heroically repelling the American aggression. Its courage and staunchness in the war of resistance against foreign invaders became for hundreds of millions of people a symbol of successful struggle for freedom and independence.

Today the Vietnamese people are working to fulfill their large-scale peaceful construction plans and firmly upholding their sovereignty and socialist gains against the intrigues of the imperialist and hegemonist forces.

Being part and parcel of the single fraternal family of the peoples of the socialist community, Vietnam is making a tangible contribution towards removing the threat of war. It is a staunch champion of detente, of ending the arms race, of developing mutually beneficial international cooperation and of safeguarding a firm and just peace.

The enemies of Vietnam would like to check the growth of its international prestige and to hold back its peaceful construction. They are trying to create an atmosphere of confrontation in Southeast Asia and to set the ASEAN countries at loggerheads with their Indochinese neighbours.

Vietnam jointly with Laos and Kampuchea is consistently advocating the establishment of a zone of peace and stability in Southeast Asia and a dialogue with the ASEAN countries to normalize the situation in the region. These constructive steps add to Vietnam's international prestige.

The Non-Proliferation Treaty has an important role to play in the efforts aimed at lessening the threat of nuclear war. Although the treaty does not abolish nuclear weapons, it is called upon to strengthen peace and international security. However, a number of countries, among them China, Pakistan, Israel and South Africa, evade in every way signing the treaty while making no secret of their nuclear ambitions. Meanwhile, prevention of the spread of

nuclear weapons is an essential and quite effective component of the most urgent task of our time, that of saving mankind from the threat of nuclear catastrophe.

Today all the states are called upon more urgently than ever before to make practical and purposeful efforts for this lofty objective. Fully aware of this responsibility, Vietnam enthusiastically approves and supports the Soviet Union's pledge, made at the second special session of the UN General Assembly, not to be the first to use nuclear weapons and views it as a fresh strong impetus to the cause of disarmament.

CSO: 5100/2192

INTERNATIONAL AFFAIRS

BRIEFS

CEMA SESSION ENDS--The 42d session of the CEMA permanent commission for cooperation in the use of atomic energy for peaceful purposes has ended in Sofia. The commission discussed certain tasks connected with expanding this cooperation in fulfilling the long-term target-oriented program for the period up to 1990 and in the long term. Bilateral and multilateral agreements were signed that were based on the principle of scientific-technical and industrial cooperation in the use of atomic energy for peaceful purposes. [Text] [AU111936 Sofia Domestic Service in Bulgarian 1730 GMT 11 Jun 82]

CSO: 5100/2192

TASKS OF STATE ATOMICS AGENCY AUTHORIZED

Warsaw DZIENNIK USTAW in Polish No 12, 22 Apr 82 pp 237, 238

[Item 89, Council of Ministers Decree of 2 April 1982 Regarding Detailed Scope of Operation of the PAA [State Atomics Agency]]

[Text] Based on article 6, paragraph 1 of the law of 27 February 1982 concerning the formation of the PAA (DZIENNIK USTAW No 7 Item 64) the following is ordered:

Section 1. Regarding its detailed scope of operation, the PAA will:

- 1) coordinate and supervise all activities in the field of atomics conducted on the territory of the Polish People's Republic;
- 2) conduct basic and applied research in the field of atomics, especially in high-energy physics, nuclear physics, controlled thermonuclear synthesis, nuclear chemistry, radiobiology and reactor physics and engineering;
- 3) design, realize and operate pilot nuclear facilities;
- 4) develop and apply nuclear technology apparatus, equipment and material;
- 5) produce and trade nuclear technology apparatus and equipment as well as radioactive material;
- 6) record and supervise the security and movement of radioactive materials and nuclear fuels;
- 7) be concerned with radiation protection and nuclear safety;
- 8) neutralize and store radioactive wastes;
- 9) license and supervise the use of all nuclear facilities and equipment from the viewpoint of nuclear safety;
- 10) authorize the employment of pivotal cadres to operate nuclear equipment;
- 11) participate in national defense work in the field of atomics;

- 12) widely inform the public about the state's activities in the field of atomics;
- 13) cooperate on an informational scale in the field of atomics in the areas defined in points 1-9;
- 14) supervise the execution of tasks by subordinate units.

Section 2. 1. It is the task of the PAA to set directions of activities in the areas designated in section 1 in accordance with social and economic needs and state policy.

2. The PAA realizes these tasks chiefly by forecasting and programming comprehensive activities in the development and peaceful use of atomics; by analyzing and evaluating the activities of scientific-research centers of enterprises and other organizational units included in the PAA system; by coordinating these activities; by collaborating in forming economic systems supervised by organizational units; by conducting cadre policy; and by providing aid in the training of cadres in the field of atomics.

Section 3. To realize the tasks specified in section 2, the PAA will:

- 1) create necessary conditions for structural changes, development and production;
- 2) evaluate the consistence of directions of activities of supervised units with the adopted provisions of the economic and social policies of the state and obligatory legal regulations;
- 3) analyze the functional effectiveness of economic system solutions; undertake or plan conceivable revising activities;
- 4) cooperate in establishing economic parameters and standards affecting the direction of activities of supervised units;
- 5) cooperate in the preparation of drafts of national socioeconomic plans and other central plans, and supervise and coordinate the execution of plans in the areas established in specific regulations;
- 6) prepare drafts of international economic, scientific-technological and commercial agreements as well as supervise their implementation;
- 7) initiate the development of exports and rationalize the import of products, materials, raw materials, machines and equipment;
- 8) inspire and create conditions for research and development and its applications;
- 9) cooperate in the effective use of raw materials, materials, fuel and energy;
- 10) Cooperate in the shaping of price and wage policies;

- 11) stimulate activities and create conditions for improving the organization of management and functioning of supervised units;
- 12) create conditions for the proper flow of economic, scientific and technical information;
- 13) evaluate the working, social and living conditions of workers and take action to improve these conditions;
- 14) shape policy for preparing and increasing cadres and evaluating them;
- 15) affect the elimination or limitation of activities that harm the natural environment in the sphere of its activities.

Section 4. In the course of executing the tasks specified in section 1 and section 2, paragraph 1, the PAA collaborates with the chief and central organs of state administration; with sociopolitical, cooperative and other organizations; and with trade unions in accordance with obligatory regulations.

Section 5. This decree is effective on the date of announcement.

President of the Council of Ministers
General of the Army W. Jaruzelski

11899
CSO: 5100/3022

ARGENTINA

NUCLEAR ENERGY TO BE DEVELOPED FOR MILITARY PURPOSES

PY250353 Buenos Aires Argentina Televisora Color Network in Spanish 0000 GMT
25 Jun 82

[Interview in the "60 Minutes" program with Carlos Castro Madero, chairman of the National Atomic Energy Commission, by unidentified journalist on 24 June-- place of interview not given]

[Text] [Question] Admiral Castro Madero, we understand that General Bignone made a special request to the navy commander in chief to allow you to stay on as chairman of the National Atomic Energy Commission [CNEA]. We would like to ask you about your plans for the immediate future.

[Answer] The president-designate, General Bignone, indeed asked the navy commander in chief to allow me to remain on my job. The commander in chief granted his permission and I naturally accepted the honor. Later on General Bignone called me to the War College and offered the job to me personally.

My plans are to continue with whatever we have been doing. Despite the conflict the CNEA is proud of the fact that its policy has proven to be the most suitable and it will be maintained. As far as the construction projects in which we are currently engaged, in the coming days we will dedicate a testing site for fuel elements, and this site will also be used for testing pumps and compressors produced by the various factories in order to stimulate them to greater participation in Argentina's nuclear development.

[Question] However, there are bound to be priorities as a result of our military experience and the proven illegal utilization of nuclear energy by the enemy.

[Answer] The priorities established by the CNEA will be maintained. But as you pointed out there is a new factor resulting from the conflict in which we have been involved. This factor is the possibility of Argentina developing nuclear submarines. We must be cautious on this issue and we will begin by conducting feasibility studies to determine the cost of the project, the time that will be required and whether we will need foreign aid to carry it out. On the basis of this study the appropriate authority will decide whether it will be carried out or not.

[Question] Admiral, there have been reports that the United States will apply pressure on Argentina, among other countries, to curb its nuclear development.

[Answer] I believe that it will make an effort in this direction. We know of the concern expressed by the U.S. Senate regarding Argentina's nuclear development, and the fact that we are practically independent from its aid. This makes them fear that Argentina could move toward military development [of nuclear energy]. Therefore, I believe that for this own peace of mind they will exert considerable pressure on nations that supply technology to Argentina in order to make them discontinue the flow.

[Question] To close this interview, Admiral, we would like to ask you whether after the Malvinas incident does the CNEA have any economic obligation to Latin America?

[Answer] Certainly not. Another source of satisfaction for us is the fact that the CNEA has exercised an open policy toward the Latin American nations, a policy which has been duly repayed during these difficult times for the nation.

[Journalist] Thank you very much.

[Castro Madero] Thank you for your visit.

CSO: 5100/2196

SITE OF REPROCESSING PLANT STILL UNDETERMINED

Rio de Janeiro GAZETA MERCANTIL in Portuguese 28 Apr 82 p 7

[Text] Sao Paulo--The site and the beginning of operation of reprocessing the waste of the Brazilian atomic plants have not yet been decided by the Brazilian Nuclear Corporation (NUCLEBRAS). Under the agreement, the American Purex process will be transferred to Brazil by the German Kewa and Uhde, the latter being a chemical engineering company, and Kewa, a subsidiary of the Deutsche Gesellschaft Fuer Wiederaufarbeitung Von Kernbrennstoffen MBH (DWK).

Purex

A plant of the Angra-II (PWR) type, of the Kraftwerk Union (KWU), which operates with uranium enriched at 3.2 percent of (fissionable) Uranium-235, in 3 years generates 32,000 MW day/tons of thermal energy and leaves waste of: 96 percent of uranium, with 0.9 percent of Uranium-235; 1 percent of plutonium; and 3 percent of high radioactivity wastes. Each year, Angra-II eliminates 35 tons of spent fuels. Therefore, these wastes alone require a Purex plant for about 300 ton/year, capable of handling nine atomic plants of the Brazilian Electric Power Stations (ELECTROBRAS) Plan 2000. And all that is known is that NUCLEBRAS wants to operate one on a pilot plant scale this decade.

Purex dissolves the plant waste in nitric acid, chemically separates the uranium and plutonium from the rest and then one from the other. The highly radioactive wastes (3 percent of the total) still need to be solidified and vitrified beyond the Purex process. Since the reusable uranium and the plutonium have a long radioactive life, they can be stored for future use in a generation of fast-breeder reactors, said Wolfgang Breyer, KWU spokesman in Brazil. In those fast-breeders, the plutonium is used at rates of 10 percent mixed with the reprocessed uranium, "because with more rapid neutrons, fission is more difficult," Breyer explained.

Pools

According to Breyer, West Germany itself has been storing the waste in pools of heavy water reactors, in centralized storage places in Gorebens and Ahaus, in addition to purchasing reprocessing services in France. The German WAK, in operation since 1971, has already processed 110 tons in a semi-industrial unit. But the governments of Hesse, Bavaria and Rhineland-Palatinate have gotten ready to receive industrial units, the installation having been approved (licensed in 1977) in the first two German states, observed Breyer.

8711

CSO: 5100/2178

NEW NUCLEAR RESEARCH CENTER TO BE BUILT IN RIO SUBURB

Brasilia CORREIO BRAZILIENSE in Portuguese 16 May 82 p 18

[Text] At its last meeting, the deliberative committee of the National Nuclear Energy Commission (CNEN), decided to approve the installation of a new nuclear research center with an area of 8,000 square meters to be built in Santa Cruz, a suburb of Rio de Janeiro.

The same resolution decided to gradually transfer all activities now carried on in the Nuclear Engineering Institute on Fundao Island, Rio, to the new center, the construction of which had already been authorized by President Joao Figueiredo and by Minister of Mines and Energy Cesar Cals. The resolution does not mention costs, stating only that the land where the new center will be built already belongs to the CNEN.

In its clauses, the resolution of the CNEN deliberative committee, which is presided over by Professor Hervasio Guimaraes de Carvalho, stated that, among other things, the signing of an agreement in the Foreign Ministry on 29 July 1981 between the Federative Republic of Brazil and the Italian Republic for joint research in the field of fast-breeder reactors requires expansion of the present research area of Fundao Island.

According to the resolution, the Campo de Roma Research and Development Center, as the new institute is called, will operate in the following areas of nuclear research: fast-breeder reactors, nuclear fusion, the fuel cycle and intersectorial activities.

The CNEN decision to install another nuclear research center in Brazil is viewed by sector specialists as only a showy move by the commission which, after the establishment of the Brazilian Nuclear Corporation (NUCLEBRAS), lost the functions it had in technological research and development and control over the nuclear fuel cycle industrial installations, becoming responsible only for the regulatory aspects of nuclear activities in the country.

The installation of a new center will contribute further to the fragmentation and overlapping of nuclear research in Brazil. According to those specialists, although Brazil lacks resources for research and development, it indulges in the luxury of duplicating research in the nuclear area in more than one research center simultaneously.

There is no policy of coordinating nuclear research in the country. The CNEN wants to conduct its own research, NUCLEBRAS likewise, and so too do state governments, such as Sao Paulo, which operates the Nuclear and Energy Research Institute (IPEN), today still the largest in the country but whose work is not recognized by the CNEN or NUCLEBRAS.

In the case of the new CNEN research center, some of the areas in which it is going to operate are already covered by research conducted by NUCLEBRAS at its Nuclear Technology Development Center (CDTN) in Belo Horizonte; by the IPEN in Salo Paulo; and by the University of Campinas (UNICAMP), in Campinas, the latter in the area of nuclear fusion.

8711

CSO: 5100/2178

BRAZIL

BRIEFS

NUCLEAR FUEL RAW MATERIAL--Brazil has been able to produce, for the first time and with local technology, a reasonable amount of uranium hexafluoride (UF₆), which is the final raw material for the manufacturing of nuclear fuel. The material was processed by IPEN--Nuclear and Energy Research Institute--of Sao Paulo, which already has a stockpile of approximately 50 kg of the product. According to IPEN superintendent Hernani Lopes Amorim, the program in progress foresees the construction of a master plant able to produce up to 25 kg of uranium hexafluoride per hour for a period up to 1984. This substance was prepared with the help of a pioneering prototype designed to produce fluorine, which is essential to the manufacture of UF₆. [Text] [PY300155 Rio de Janeiro JORNAL DO BRASIL in Portuguese 25 Jun 82 p 1]

CSO: 5100/2202

BID CALL FOR NUCLEAR PLANT CONSTRUCTION CANCELED

Cancellation Announced

FL111325 Mexico City NOTIMEX in Spanish 0210 GMT 11 Jun 82

[Excerpts] Mexico City, 10 Jun (NOTIMEX) -- In view of the country's financial situation and at the recommendation of the Economic Cabinet, the Federal Electricity Commission today canceled the international call for bids to build a second nuclear power plant. The announcement was made following a technical evaluation of the bids made and before learning about the commercial and financial conditions set by the participating enterprises.

The decision to cancel the call for bids and postpone the construction of a second nuclear plant was made after analyzing this project within the framework of a program designed to adjust the nation's economic policy.

Canadian Envoy Comments

FL111415 Mexico City NOTIMEX in Spanish 0220 GMT 11 Jun 82

[Excerpt] Mexico City, 18 Jun (NOTIMEX) -- James Russell McKinney, Canada's ambassador to Mexico, said today that his country respects the government's decisions regarding the nuclear program. He added that the cancellation [of the call for bids to build a nuclear plant] will in no way change the good relations between the two countries.

According to the ambassador, his government had offered to provide Mexico with nuclear technology, beginning with the fuel cycle, the manufacture of components, and even a collateral industry, at better prices than the other six bidding countries.

The Federal Electricity Commission announced that it is canceling the program originally planned for the year 2000 as a substitute for 25 percent of the required electrical supply.

CSO: 5100/2192

NUCLEAR POWER PLANT FORESEEN IN 20 YEARS

Tel Aviv MA'ARIV in Hebrew 9 May 82 p 14

[Article by Avraham Peleg: "Israel Can Build a Nuclear Power Plant in 20 Years"]

[Text] If suitable financial resources are made available to the Israeli nuclear scientists, they would be able to build a nuclear power plant in about 20 years, stated the president of the Technion, Mr Amos Horev, in a tour for a group of science and medical writers arranged last week in Technion City in Haifa.

Mr Amos Horev, who serves as chairman of the Commission for Studying Building of Nuclear Power Plants in Israel, added that the maximum research and development involved in the independent construction of a nuclear power plant will require about 4,000 people, including hundreds of engineers. However, in Israel there is now an apparent shortage of manpower in the nuclear field, and among the reasons for this is the uncertainty about the plans for nuclear energy in Israel.

The president of the Technion noted that had there been a continuation of the research and development involved in the construction of the reactor in Dimona, then Israel would already have a nuclear reactor with a capability of producing about 300 megawatts of electricity. If Israel aspires to build a nuclear power plant to be operational in 1992, the only way to do this is to purchase such a reactor from the United States, Canada, France, or someone else in the West.

The Technion has decided to launch an effort for the development of a staff of nuclear engineers and the advancement of nuclear research and development. For this purpose there is now under construction on the Technion campus a building for the nuclear engineering department which is now located on the old campus in Hadar Carmel. The president of the Technion stated that construction of the building on the new campus would be completed within a year, and in the meantime, the Technion has added 15 senior nuclear scientists to the department.

Among other things, the president of the Technion warned about a freeze in the development of a young scientific staff in all the universities in Israel.

Mr. Horev added that the high schools in Israel do not adequately prepare their students for higher studies. This is primarily true for the natural sciences.

During the tour, Professor Moshe Ron, chief of the hydrogen laboratory in the department of materials engineering, made a presentation on the development of a hydrogen-operated air conditioner for buses. The laboratory scientists are developing a heat pump which operates on hydrogen stored in hydrides (a compound of elements which combine with hydrogen). The heat required to operate the pump comes from the exhaust gases from the engine. The energy required today for operating air conditioning in the conventional installations in buses accounts for about 30 percent of the total gas consumption of the vehicle whereas in the Technion's heat pump this energy consumption would be saved.

The American company Ansul has invested \$250,000 in the development of the Technion's heat pump.

5830

CSO: 5100/4722

ISRAEL

BRIEFS

NUCLEAR POWER SITES STUDIED--A crew from the Energy Ministry is checking four sites in the Negev in which it will be possible to build a nuclear power station. Yesterday this crew toured the sites headed by the Ministry Director General Uri'el Lynn. Our correspondent Gadi Sukenik has learned that when the decision to build a nuclear power station is made, one of those sites will be chosen and a nuclear reactor will be built there. Israel is to purchase the reactor from another country; but if efforts to buy such a reactor fail, one might be built in Israel, although this would be two or three times more expensive than buying one. [Text] [TA221324 Jerusalem Domestic Service in Hebrew 1300 GMT 22 Jun 82]

CSO: 5100/4724

WARNING SYSTEM AGAINST RADIATION HAZARDS FROM KOEBERG

Capetown DIE BURGER in Afrikaans 28 May 82 p 21

[Text] The health department of the Cape's city council has installed six monitoring instruments for measuring the atmosphere's gamma radiation on a 24-hour basis. This is to make 100 percent sure that radio active material does not get to Capetown from the Koeberg Nuclear Power Station by way of the air current. These sophisticated instruments have been imported from the United States.

The City Council has installed the monitors in Seepunt, Groenpunt and Woodstock as well as over Capetown's urban center and at the borderline of Milnerton and Epping so as to cover the Cape's Flatlands to the south.

In answer to a question posed to him in Parliament, Mr F. W. de Klerk, the minister for mineral and energy affairs, said that radioactive fallout, released in the air and sea from the Koeberg Nuclear Power Station, is not going to pollute the environment; nevertheless the environment will be checked constantly for radioactive contents.

Mr De Klerk said that only "traces" of radioactive gasses, which are non-contaminating, will be released in the atmosphere. These gasses will not be concentrating in the environment. The release of gasses will be taking place periodically and at a rate which is in agreement with internationally accepted standards and as prescribed by the Atomic Energy Board.

In a statement, the city surgeon, Dr R. J. Coogan, announced that there is a possibility that the wind could carry these gasses to the center of the city under certain weather conditions. Favorable conditions for this could occur at about 15 percent of the year and most probably during spring and autumn.

In the event of an accident at the Koeberg Nuclear Power Station all possible emergency measures will be put into effect.

Wind Factors

He said that radioactive gasses will be liberated only when there is assurance that the prevailing winds will not carry the gasses to the city. "If

Koeberg works as well as it is supposed to, then I hope that there will never be an increase in the background radiation limits in Capetown. At present there are between 12 and 20 microradials."

There are at least two wind factors to worry about. This has become apparent from the air pollution samplings for greater Capetown taken by the University of Capetown for the City Council and also from the recent notations made by the Atomic Energy Board on the subject of nuclear safety.

Alarm

The southern winds pattern is very complicated and a backwards movement has been observed in some regions at various levels. At certain times there is a very clear pattern of breezes.

Breezes from coastal regions north of Capetown blow over the sea, they flow around Robben Island and return back to the city over Groenpunt and the harbor area and then to the foot of the mountain. This can happen on mornings and evenings.

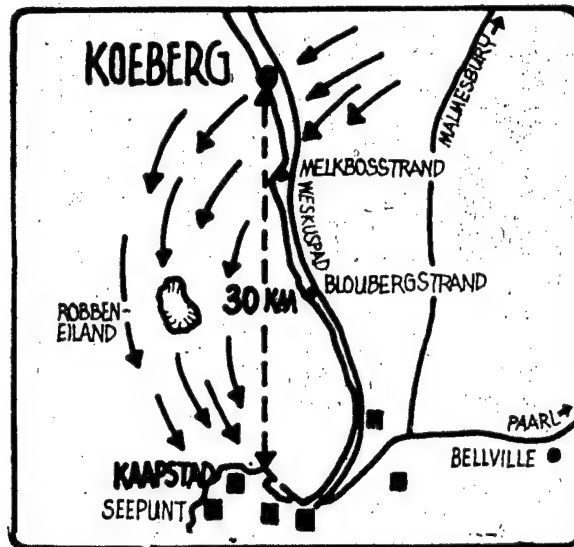
An alarm and warning lights at the center for civilian defense will be activated when the gamma radiation readings rise to a certain level at any time of the day or night. The necessary actions will then be taken immediately.

The situation is being watched on a 24-hour basis in this center. The alarm signals will be transmitted from there by wire.

The monitoring instruments will also be recording radiation levels continuously. The records will be studied weekly so that any change will be observed. This equipment has already been in operation for 2 months and thus one year's background readings can be obtained and the readings compared when the nuclear power station will be in operation as expected early next year.

EVKOM [Electricity Supply Corporation] has five small monitors which have been installed over a wide area of the city and data will be collected at every 3 months.

Members of the City Council's personnel for air pollution have taken courses in nuclear radiation so as to be properly informed on the procedures being planned. EVKOM has consented to allow them inside its monitoring chamber and if necessary will even allow them to measure the records of the radioactive material released by the power station. "This is of enormous importance and EVKOM must be congratulated for its insight and collaboration." So stated Dr Coogan.



Caption:

The direction in which, under certain circumstances, the wind could possibly carry radioactive gasses from the Koeberg Nuclear Power Station to Groenpunt and center city is shown by arrows. The city surgeon, Dr R. J. Coogan, said that although the gasses will be purified there will have to be 100 percent assurance that these will not be released when such weather conditions prevail.

7964

CSO: 5100/5665

NEW STRUCTURE FOR SA NUCLEAR ACTIVITIES FORMED

Johannesburg THE CITIZEN in English 23 Jun 82 p 14

[Text]

ALL State-financed nuclear activities in South Africa would in future fall under one body, to be known as the Atomic Energy Corporation of South Africa, the Minister of Mineral and Energy Affairs, Mr F W de Klerk, announced in Pretoria yesterday.

He said the change, which would be introduced on July 1, was the first major step in the restructuring of the country's nuclear activities.

The Uranium Enrichment Corporation of South Africa and the Atomic Energy Board would be re-established as full subsidiary companies of the AEC, he added.

They would in future be known respectively as the Uranium Enrichment Corporation of South Africa (Ucor) and the Nuclear Development Corporation of South Africa (Nucor).

Dr J W L de Villiers, presently president of the Atomic Energy

Board, will serve as the first full-time chairman of the Atomic Energy Corporation.

The other members of the Board of Directors of the new State corporation will be: Mr S J P du Plessis, Director-General of Mineral and Energy Affairs, Mr D A Etherredge, chairman of Nufcor, Mr G A Macmillan, chairman of the Palabora Mining Group, Mr J H Smith, chairman of Escom, Mr J A Stegmann, managing-director of Sasol, Dr N Stutterheim, chairman of Telephone Manufacturers of SA and vice chairman of Mintek, Mr Donald Sole, outgoing Washington Ambassador, and Mr J van Dalsen, Director-General of Foreign Affairs and Information.

Dr W L Grant will remain on as managing-director of the Ucor subsidiary, while Dr J H P Hugo, presently deputy-president of the Atomic Energy Board, will be appointed managing-director of the Nucor-subsiary.

CSO: 5100/5679

SOUTH AFRICA

BRIEFS

URANIUM ENRICHMENT--South Africa would begin in 1987 with the production of enriched uranium, the outgoing chairman of the Uranium Enrichment Corporation, Dr Ampie Roux, said yesterday. He told the Pretoria Newspaper, Hoofstad, South Africa would then be self-sufficient as far as supplying fuel to nuclear plants, such as Koeberg, was concerned. As the Republic could not be assured of an export outlet, any further extensions to the corporation's programme would be to meet local requirements, he added. [Text] [Johannesburg THE CITIZEN in English 15 Jun 82 p 3]

CSO: 5100/5676

FRANCE

PROTECTION, CONTROL OF NUCLEAR MATERIALS DURING TRANSPORT

Paris JOURNAL OFFICIEL DE LA REPUBLIQUE FRANCAISE in French
2 May 82 pp N.C. 4196-N.C. 4198

[Administrative decision dated 26 Mar 82]

[Text] The minister of the interior and decentralization, the minister of transport, the delegate to the minister of economy and finance, chief budget officer, and the minister of industry:

In consideration of law no 80-572 of 25 July 1980 on the protection and control of nuclear materials;

In consideration of decree no 81-512 of 12 May 1981 concerning the protection and control of nuclear materials, particularly its article 24;

In consideration of the administrative decision of 2 November 1976, modified by the administrative decision of 29 October 1981, creating a nuclear protection and safety institute;

In consideration of the report of the secretary general of the cabinet committee on nuclear safety;

And in consideration of the report of the commission on the protection of nuclear materials during transport, created by article 20 of the decree of 12 May 1981, listed above,

Hereby stipulate:

Article 1

The following provisions are applied in accordance with article 24 of the decree of 12 May 1981 stated above. They determine the rules applicable to the protection and control of nuclear materials during transport, concerning:

- a. The surveillance of the conditions in which such transport takes place, particularly with regard to following the itineraries and schedules established;
- b. The notification of the authorities in case of an incident, accident, or any event of any nature whatsoever, which may delay or compromise the execution of the transport scheduled, or the protection of the nuclear materials being transported.

Article 2

The nuclear protection and safety institute, created by the decision of 2 November 1976, acting under the authority of the minister of industry, handles operational responsibilities in the area of management and followup of the transport of nuclear materials, as stipulated by the decree of 12 May 1981.

The nuclear protection and safety institute is empowered to give the transporters all instructions of a technical or procedural nature, in application of the general rules listed in the following articles.

Article 3

French or foreign transporters with the authorization stated in article 3 of the decree of 12 May 1981 are required to apply the following provisions concerning the transport of nuclear materials of categories I, II, and III.

3.1. Notification of transport

This notification is sent by the transporter to the nuclear protection and safety institute (operational transport echelon) and to the minister of the interior (national police division and civil security division). The notice is prepared in the format defined by the nuclear protection and safety institute. Concerning the transport of nuclear materials of category I, the transporter indicates if he plans to use the public forces of order to provide an escort and, if not, he states the nature, resources, and composition of the escort. In any event, the minister of the interior may decide, if he deems it necessary, to have the public forces of order provide this escort.

This notification is to reach its destinees at least 15 days before the scheduled date of execution.

In case the transport is canceled or if the conditions stated in the notification are changed, the operational transport echelon of the nuclear protection and safety institute, the civil security division, and the national police division are to be informed immediately.

3.2. Case of incident, accident, or event which may delay or compromise the execution of transport

The agent of the transporter responsible for the execution of this transport, his deputy, or if necessary, the transporter or the organization responsible for monitoring the movement, notifies or has notified immediately:

- a. The gendarmerie brigade or the police commissariat near the site of the incident or accident, which then informs the prefect responsible in this area.
- b. The operational transport echelon of the nuclear protection and safety institute. The nuclear protection and safety institute then informs the minister of industry and the minister of the interior.
- c. The shipper and the destinee.
- d. In the case of transport covered by customs, the nearest customs facility.

Before the execution of the transport, the transporter gives his agents the necessary information so that they can notify the above authorities in case of need.

Article 4

In case of transport coming from or destined for a foreign country, the request for special transport authorization, stipulated in article 21 of the above mentioned decree, is sent by the shipper or his transporter to the operational transport echelon of the nuclear protection and safety institute at least 15 days before the date of execution of the transport. The request may be sent along with the notification of transport required in the same article for shipments subject to prior notification requirements.

It contains the information listed in the final paragraph of article 21 mentioned above. It also sets forth the conditions for the transfer of responsibility for execution and for

the protection of the transport, as well as the customs facility to be used.

For transports of natural uranium, slightly enriched uranium, and thorium, which are not subject to the prior notification requirement, the request for special authorization also contains the information normally included in the notification, as defined by the operational transport echelon of the nuclear protection and safety institute.

The nuclear protection and safety institute submits the request for approval to the minister of industry and notifies the shipper or his transporter of the decision made.

Article 5

For the transport of nuclear materials of categories I and II listed in article 22 of the decree of 12 May 1981, the following provisions are applied:

5.1. Agreement for execution of transport

A report issued by the transporter sent by telex must reach the nuclear protection and safety institute (operational transport echelon), which notifies the minister of the interior (national police division and civil security division), the minister of industry, and in the case of a transport coming from or going to another country, the chief budget officer (general customs and indirect tariffs division), at the latest, 3 working days before the scheduled date of execution. This message contains the information defined by the nuclear protection and safety institute and also includes the itinerary selected and, if a border must be crossed, the customs facility to be used, the schedule proposed, the means used for the ongoing control of the transport, the composition of the transport crew, and for transports of category I, the composition and resources of the escort, if the public forces of order are not used.

The execution of the transport is dependent upon the approval of the nuclear protection and safety institute. The minister of the interior and the minister of industry may at any time, either before or during the execution of this transport, modify the conditions of execution or make the protective measures used more stringent. The nuclear protection and safety institute is to be notified of this, and it then has the responsibility to report to the services concerned; it does the same for its own mission.

After delivery to the destinee, the transporter:

- a. Immediately notifies by telex message the shipper and the operational transport echelon of the nuclear protection and safety institute. A copy of this message is sent to the destinee.
- b. In the case of highway transport, prepares a transport report sent to the operational transport echelon of the nuclear protection and safety institute in the format prescribed by this organization.

If two or more authorized transporters take part in succession in the same transport operation, a single transport report may be issued, including information covering the entire movement and, in particular, the conditions for handling the continuity of the followup and protection and the modalities of the transfer(s) of responsibility for the transport operation. If necessary, the nuclear protection and safety institute may require that each transporter send it a report if the requirements of protection and control so warrant.

5.2. Continuous control of transport

To ensure the continuous control of transports, appropriate resources, particularly communications, to ensure surveillance of the movement and the execution of transport must be employed.

Depending on the particular case, the nature of these resources is determined:

- a. At the time of the issuance of the authorization to conduct a transport activity, based on the information accompanying the authorization request, as set forth in article 4.5 of the decree of 12 May 1981.
- b. As part of the procedure for approval of the resources used for transport, determined by article 22 of the decree of 12 May 1981.
- c. As part of the approval procedure for organizations handling continuous control of transport, determined by article 22 of the decree of 12 May 1981.

Their conditions of utilization are defined by the nuclear protection and safety institute at the time the approval for the execution of transport is issued.

Article 6

The escort listed in article 23 of the decree of 12 May 1981 which is to provide special protection for the transport of nuclear materials of category I has as its mission:

- a. To facilitate the proper handling of the movement.
- b. To anticipate and prevent any violent action aimed against the transport vehicle, or designed to remove the materials it contains, or any impediment to the execution of this transport.
- c. To alert the closest units of the public forces of order.
- d. To provide a guard for the convoy according to the conditions prescribed in article 7 below.

This escort must consist of one or more vehicles independent of the vehicle transporting the nuclear materials and it must have means of communication with the vehicle. The transporter must provide the escort with means of communication with the transport vehicle. However, for transports not using highways, these instructions may be modified, according to special arrangements made for transports by rail, river, sea, or air, as defined in article 7.2 following.

The minister of the interior (national police division) is consulted in cases in which this division is used to provide protection for the transport.

Article 7

The following rules must be respected by the transporters:

7.1. Transports by road

The transporter must keep the destinee informed of any significant delays which may occur during the movement. If the delivery does not take place on schedule, the destinee is to contact the transporter and, if necessary, the operational transport echelon of the nuclear protection and safety institute.

In the case of a transport originating in or going to another country, the transporter's agent who is responsible for the execution of this transport, without affecting compliance with customs formalities, is to contact the air and border police, who then inform the operational transport echelon of the

nuclear protection and safety institute about the passage of the vehicle.

Vehicles transporting nuclear materials of categories I and II must:

- a. Have a crew composed of a minimum of two persons: one agent responsible for the execution of the transport and his assistant.
- b. For short stops, including meal breaks, remain under the guard of the crew and, for materials of category I, under the guard of the escort.
- c. At night, if they are not traveling, the vehicles must be placed in a closed and guarded facility. The nuclear protection and safety institute is empowered to seek the necessary authorizations if public facilities are to be used.

The agent responsible for the execution of transport must be able, upon any demand from agents listed in articles 5 and 9 of the law of 25 July 1980, to provide evidence of:

- a. The authorization to conduct a transport activity, issued to the transporter in the conditions set by article 3 of the decree of 12 May 1981.
- b. The approval issued by the nuclear protection and safety institute for materials of categories I and II, according to the terms of article 5.1 of this decision.
- c. The special authorization listed in article 21 of the decree of 12 May 1981 in the case of a transport originating in or going to a foreign country.

7.2. Transports by railroad, by river, sea, or air

Transports made by railroad, river, sea, or air transportation, within the limits of French territory and in all places under French sovereignty, are covered by the agreements and special modalities to be submitted to the commission cited in article 20 of the decree of 12 May 1981.

7.3, Any interruption in loading during transport is to be covered by special precautions and provisions which are submitted to the nuclear protection and safety institute (operational transport echelon).

In particular, every possible measure must be taken to limit the storage of containers of nuclear materials in railroad stations, ports, or airports.

Article 8

This administrative decision will be published in the JOURNAL OFFICIEL DE LA REPUBLIQUE FRANCAISE.

Paris, 26 March 1982.

The minister of industry: Pierre Dreyfus

The minister of the interior and decentralization: Gaston Defferre

The minister of transport: Charles Fiterman

The delegate to the minister of economy and finance, chief budget officer (acting by delegation for the minister): staff, director, L. Schweitzer

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CSO: 8119/1389

UNUSUAL CONTRACT FOR GOLFECH SIGNED BY MIDI-PYRENEES, EDF

Paris LE MONDE in French 14 Apr 82 p 35

[Article by Marc Ambroise-Rendu: "Midi-Pyrenees Signed an Unusual Nuclear Contract With Electricite de France (EDF)"]

[Text] On 8 February 1982, Mr Alex Raymond, socialist president of the Midi-Pyrenees Regional Council, the regional prefect and representatives of EDF signed a contract for the Golfech power station. The small ceremony, which took place at Toulouse, introduced at least three new elements into French public life.

It was the first time that a regional assembly obtained a contract in which EDF involved itself in a precise and carefully worked-out way in the economic repercussions to which the region will be subject during and after the construction of a nuclear power station.

The public establishment has never before gone so far with regard to the benefits it has granted to local communities.

Finally, 2 months after the signing, the government continues to refuse to make the actual text of the agreement public.

Neither the elected representatives who have been saying no to Golfech for years nor the antinuclear militants who have sniveled in puffs of tear gas so many times, are as yet aware of it. In carrying out their struggle, the former for the tranquility of their community, the latter against "the plutonium society," they have in fact been working for their region. The clauses of the contract (LE MONDE 11 February) that Mr Alex Raymond, socialist deputy for Haute-Garonne and president of the regional council, has obtained from EDF are very unusual from all points of view.

Let us recall, first of all, that according to the program adopted by the government last autumn, one single reactor--instead of the four initially envisaged--is currently under construction. It will be added to the network in 1988. Construction of the second reactor will not be started until after a new decision by the public authorities, in 1984.

In negotiating with EDF, Mr Raymond has not forgotten that he has on many occasions been the rapporteur on the budget for the environment in the National Assembly. At his request, the public establishment has in fact undertaken to

minimize the harmful effects of the power plant. The dam built on the Garonne to divert water to the power plant will be equipped with an elevator that will permit migratory fish to surmount the obstacle without fatigue. In the original riverbed, it will be necessary to allow 10 to 20 cubic meters of water per second to flow, according to the season. On the approaches to the plant, EDF will install landscaped amenities and, on the banks of the river, playgrounds and recreational boating facilities. The public establishment will finance studies with a view to insuring that gravel pits created in the course of construction will be utilized for fish breeding.

It should also be kept in mind that local concerns are assured of obtaining Fr 1.2 billion worth of work out of a total budget estimate of Fr 11 billion; that 60 percent of the construction workers mandatorily will be recruited locally; and that 40 percent of the employees of the power station will be natives of the region.

Finally--and this detail has never been revealed--EDF has agreed to pay Fr 10 million annually directly to the regional council throughout the term of construction, then Fr 6 million annually throughout the entire life of the power station. These sums will be in addition to the payments, according to existing agreements, that every power station pays to the department and the communes in the form of a professional tax and fiscal taxes. This is a case of a "regional" supplement that is totally unique. It will be used to finance the actions that the regional council's energy commission, initiated by Mr Jean Ibanes, socialist deputy from Arlege, intends to carry out in the search for new sources of energy.

To obtain this "golden" contract, Mr Raymond has been admirably successful in taking advantage of a difficult local situation and national circumstances. For 3 years the communes, the General Council of Tran-et-Garonne and the Midi-Pyrenees Regional Council obstinately rejected the power station. At the site incidents that were sometimes violent were constantly breaking out. Dozens of attacks have been attempted against the EDF installations and the concerns working for it.

In August 1981, the government froze five sites including the one at Golfech, and decided in each case to organize new consultations. If the communes refused the matter was referred to the regional council (and not to the general council, which is thus short-circuited). If the answer was still no, the government was to cut off discussion. The procedure is clever because it is democratic and without risk.

On Golfech, the municipal councils have stuck to their position. Thus, the regional council--with its socialist majority--finds itself in a difficult predicament. If it still says no, the government will be in the embarrassing position of having to abandon Golfech or force the hand of its friends from Midi-Pyrenees.

The "Yes, but" of the Council

The regional council gets out of the hornets' nest with a "yes, but." It agrees to withdraw its opposition on condition that it is guaranteed in black and white that the power station will, in actual fact, be profitable for the

region. After a mini-debate in the National Assembly, the government accordingly unfreezes the Golfech site for a reactor. In Toulouse, negotiations have begun; they will last more than 3 months.

On the environment, no problem, no more than on the local recruitment of construction workers. But they stumble on the amount of work to be guaranteed to the local concerns. The Ministry of Finance makes big eyes; that would, in fact, be a derogation of the rules for public purchases, rules made on the basis of calls for bids and to give competition free play. But this will be evaded by cutting the contracts into such modest slices that EDF will be able to give them out on an individual basis.

New difficulty with the regional recruitment of 40 percent of the employees of the power station. If this rule, inspired by the slogan "live and work in the country," is extended to the hundred thousand employees of EDF, the management of personnel is going to become a headache. What will the trade unions say? Finally, an agreement is reached.

But the most litigious point is the one regarding this "regional super-tax" demanded by Mr Raymond. No law provides for it. The logic of the president of Midi-Pyrenees is unassailable; you asked the regional assembly to withdraw its opposition and thus to take a political risk, he says in substance. It did it. The department was spared this trial. Nevertheless, it is the communes and the department, not the region, that will reap the harvest, notably in the form of taxes. It is unjust. Therefore, I ask you to make an effort to enable the regional council at least to finance the regional energy policy it has been asked to launch.

Midi-Pyrenees has thus obtained regular support based on the activity of the power station. If this new element is duly included in paragraph four of the agreement, it will be considered so derogatory, not to say revolutionary, that those concerned will agree not to talk about it at all.

The consequences of the "Toulouse agreement" are numerous and no doubt extensive. The first is that it puts EDF and the government in an embarrassing position. After the fashion of Midi-Pyrenees, other regions that are blessed with a nuclear power station will want now or will wish tomorrow to extract equivalent benefits by virtue of that fact. The authorities of Poitou-Charente, thinking of Civeaux, the authorities of Champagne-Ardenne, thinking of Chcoz and Nogent-sur-Seine, and the authorities of Val-de-Loire thinking of Carnet, are most curious to know exactly what EDF "gave away" for Golfech.

One can imagine that for the third and fourth reactors at Catenom, Lorraine, for its part, would like to get a better deal for this large installation, which was recently so strongly opposed. All these questions will be posed in a pressing manner starting next year when the government decides on the next steps in the nuclear program. The elections of the regional councillors by universal suffrage could become the occasion for some fancy bidding.

With these deadlines very much on their minds, several ministerial services are currently studying a reform of the procedure called "large construction site." The purpose of this procedure is to mitigate the sometimes considerable

shock that is caused in local communities by the construction of a power station. A sub-prefect is charged with coordinating the setting up of temporary facilities, opening new roads, erecting housing and installing public structures made necessary by the population influx. These facilities are financed by advances that EDF grants on the future local taxes that will be paid by the power station. According to the "Toulouse agreement," this procedure seems "overdue." A modified version "in the spirit of Golfech" is expected to be made known next month.

Second consequence: The distribution of professional taxes paid by large enterprises is no longer appropriate. It will undoubtedly be necessary to amend the law so that the regions can have their share like the communes and the departments.

No More State Within a State?

Finally, and above all, Golfech seems today to be the symbol of regionalization on the march: here is the first "regionalized" nuclear power station. Are we thus proceeding towards a reevaluation of the centralism of EDF?

"The state within a state" as some call the public establishment--will it be cut into pieces by the various local authorities to which it is in the process of surrendering power? Will it be necessary to re-read the 1946 law of nationalization, which envisaged a certain "regionalization" of electric administration and which, on this point, has never been applied? In any case, it is noted that the EDF districts were created and maintained with total disregard for the regional divisions.

Decisions concerning the provision of electricity in Midi-Pyrenees are made in Marseilles, those affecting Burgundy are worked out in Lorraine and those affecting Brittany are concocted in Clamart, in the Paris region. Will this situation be tolerated for long by the regional councils once they have matured? Certainly not. One group is thinking about it already in the rue de Monceau, at the EDF headquarters.

But in Matignon, at least, they are well past all this confusion, this regionalization that is rapidly gathering steam, and one wonders if the Toulouse socialist have not, as Mr Mauroy would say, gone "faster than the music."

The Law of the Secret

The signers of the "Toulouse agreement" agreed that the text would not be made public. On 8 February, Mr Raymond limited himself to commenting on certain points--excluding paragraph four on the special tax paid to the regional council--in the presence of journalists of the local press, including our correspondent, Catherine Laurens, who reported the proceedings.

Considering the importance of the agreement, starting the next day LE MONDE requested a copy of the document from the three signers. The president of the regional council retorted by telephone: "Would you distribute your marriage contract on the steps of the church?"

The regional prefect, Mr Jacques Corbon, answered by mail: "Some time is required so that a positive response can be given to your request." As for Mr Charles Chevrier, managing director of EDF, 1 month later he sent us a letter indicating that the document came under "the rule according to which contracts entered into by a public establishment with its partners are by nature confidential."

Invoking the laws of July 1978 and July 1979 on access to administrative documents, therefore, LE MONDE repeated its request. In vain. Two months after our initial request, that is, after passage of the time provided in the laws, the file was forwarded to the commission on access to administrative documents (the CADA), which is attempting, not without difficulty, to make the law fit the facts. The CADA is required to give its opinion within a month. Yes, or no, do the French have the right to know the details of the agreement concerning Golfech?

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CSO: 5100/2164

BRIEFS

DEBRE CRITICIZES GOLFECH CONTRACT--The agreement signed between EDF and the Midi-Pyrenees Region (LE MONDE 14 April) is beginning to give rise to various reactions. For example, in a written question to the prime minister, Mr Michel Debre, RPR deputy from Reunion, is requesting access to the "reports or the opinion of the Council of State" which Mr Mauroy must, according to him, have sought before giving his approval to the agreement. As a matter of fact, observes Mr Debre, "the generalization of the requirement that a proportion of the workers be 'natives of the region' is a violation of the constitutional principle of the equality of citizens before the law and public services. Moreover, the absence of a definition of the words 'natives of the region' could give rise to a dispute that would call into question the very principle of the unity of citizenship, without a legal definition." On the other hand, Mr Debre emphasizes, "the generalization of a royalty during the period of construction and then during the period of activity of the power station results in the creation of a tax on all French citizens, homes and enterprises without parliamentary authorization, that is to say, in an unconstitutional manner." According to the parliamentarian, "steering the republic in such a direction requires an explanation to the parliament." [Text] [Paris LE MONDE in French 18-19 April 82 p 11] 9827

CSO: 5100/2164

END